National Aeronautics and Space Administration

ARSET
Applied Remote Sensing Training
http://arset.gsfc.nasa.gov
@NASAARSET

Satellite Based $PM_{2.5}$ Data Sets and Access

Pawan Gupta

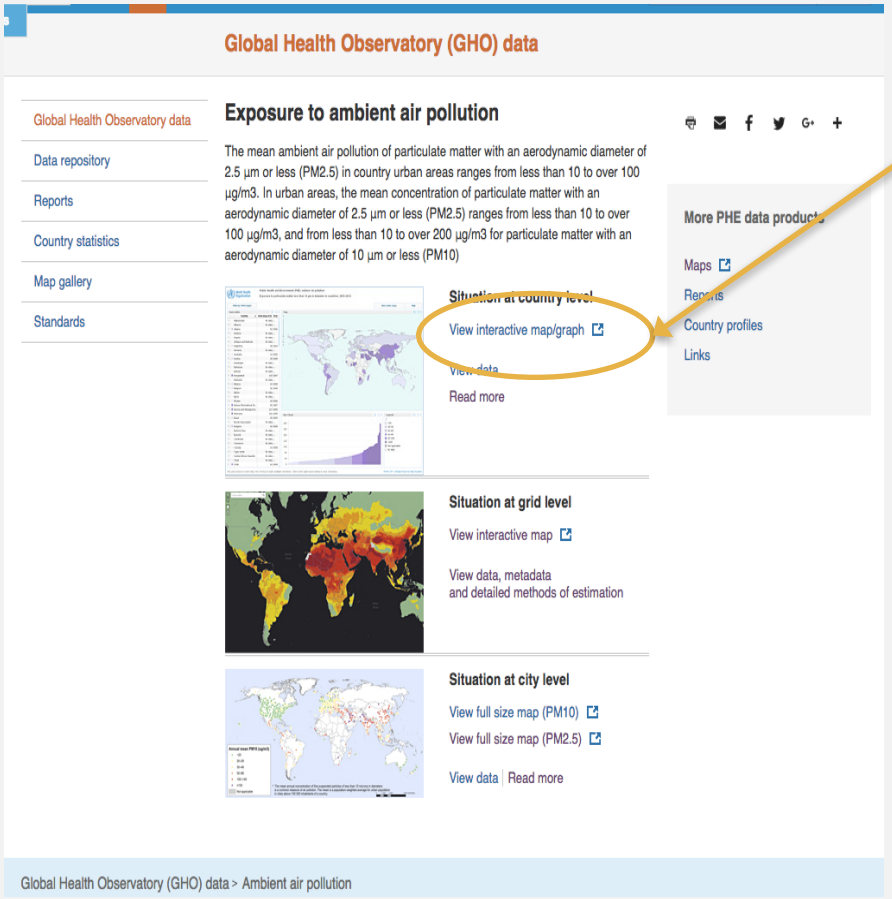
Satellite Remote Sensing of Air Quality: Data, Tools, and Applications

Tuesday, May 23, 2017 – Friday, May 26, 2017
Indian Institute of Tropical Meteorology, Pune, India

WHO $PM_{2.5}$ Data Sets

Where to Find and View the Data

WHO Website: Country Level



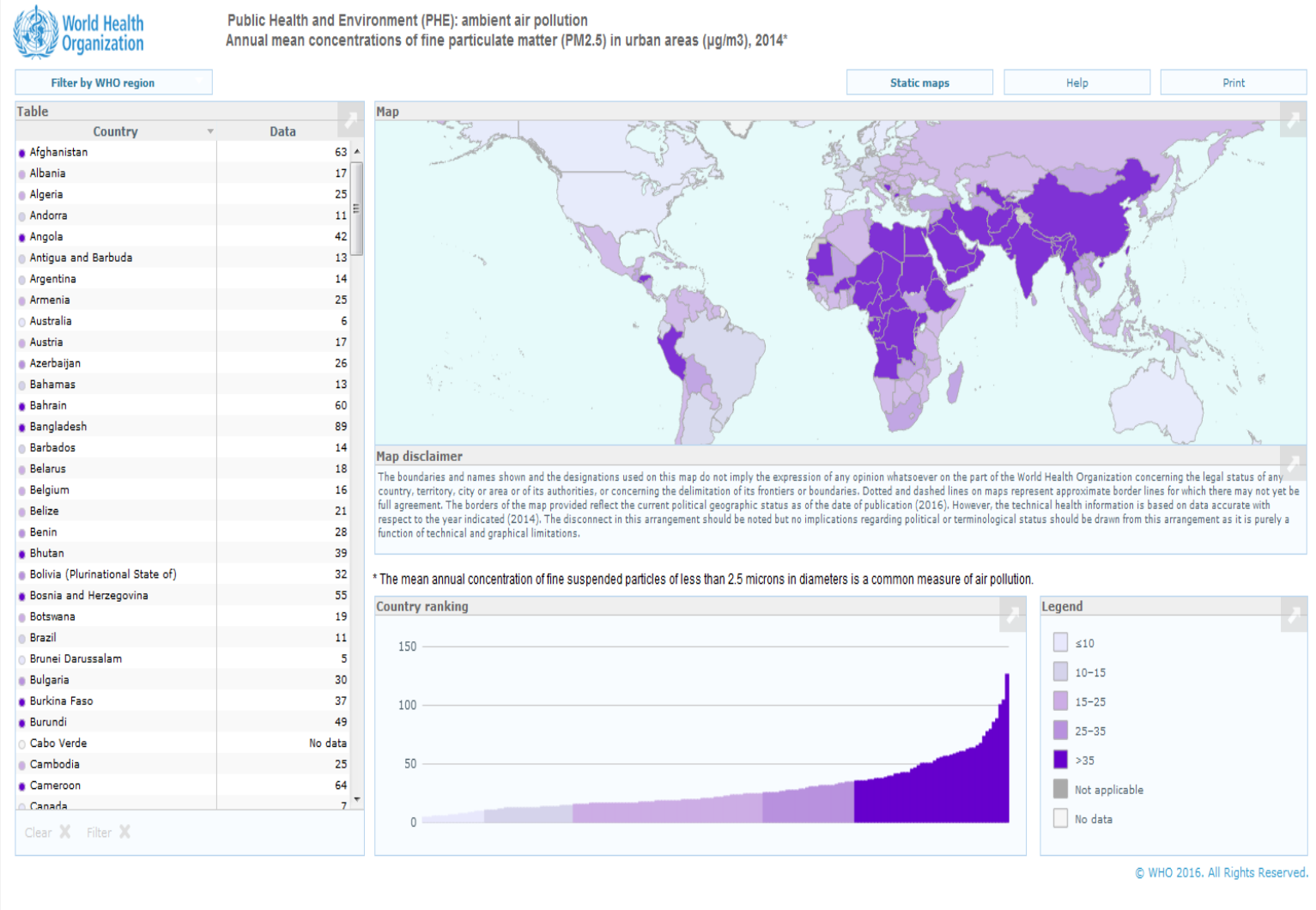
Follow this link to download 2014 country level data:

- Formats: csv, Excel, html, XML, etc.
- Can also filter by country and download

http://www.who.int/gho/phe/outdoor_air_pollution/exposure/en/

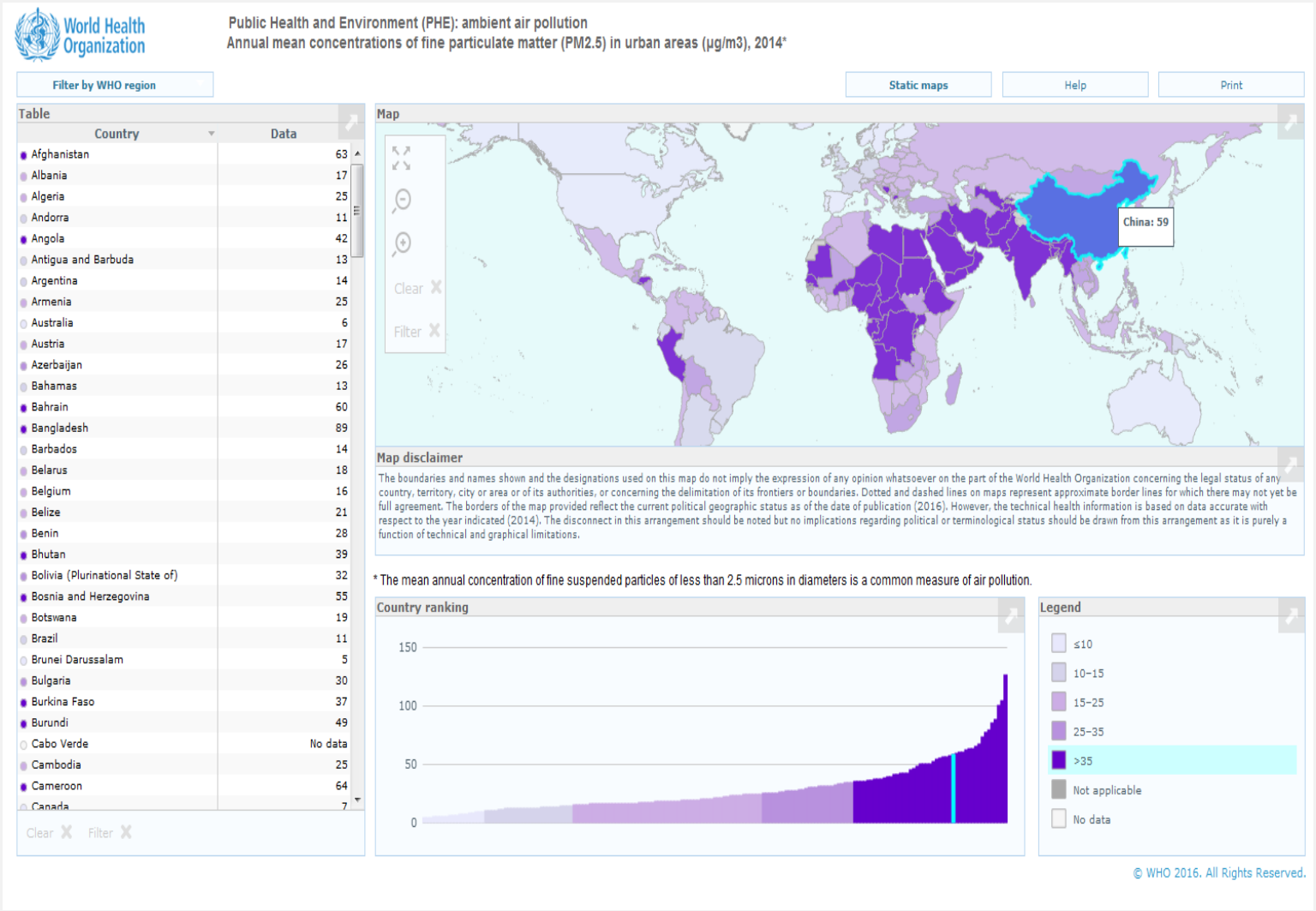
$PM_{2.5}$ at Country Level

http://gamapserver.who.int/gho/interactive_charts/phe/oap_exposure/atlas.html



$PM_{2.5}$ at Country Level

http://gamapserver.who.int/gho/interactive_charts/phe/oap_exposure/atlas.html

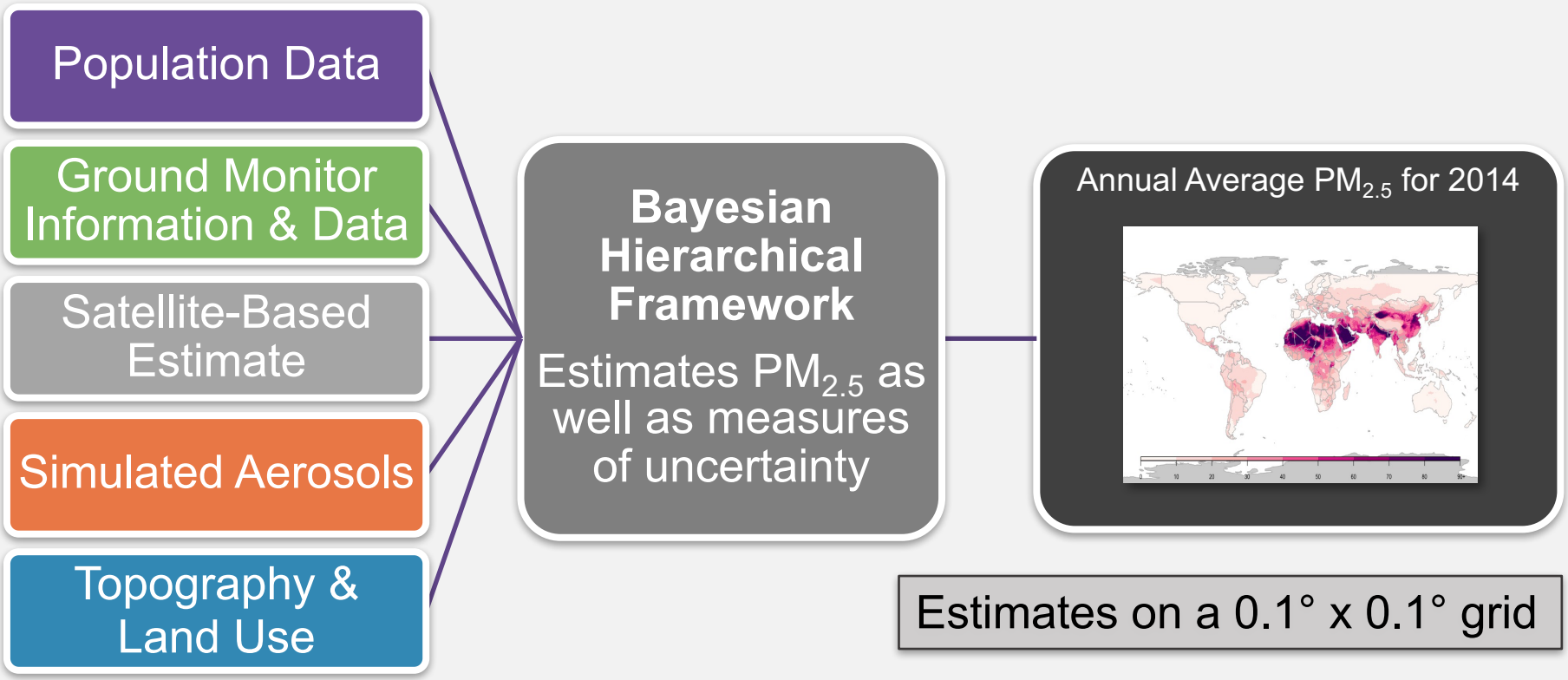


Where to Find and View the Data

WHO Website: Country Level

http://www.who.int/gho/phe/outdoor_air_pollution/exposure/en/

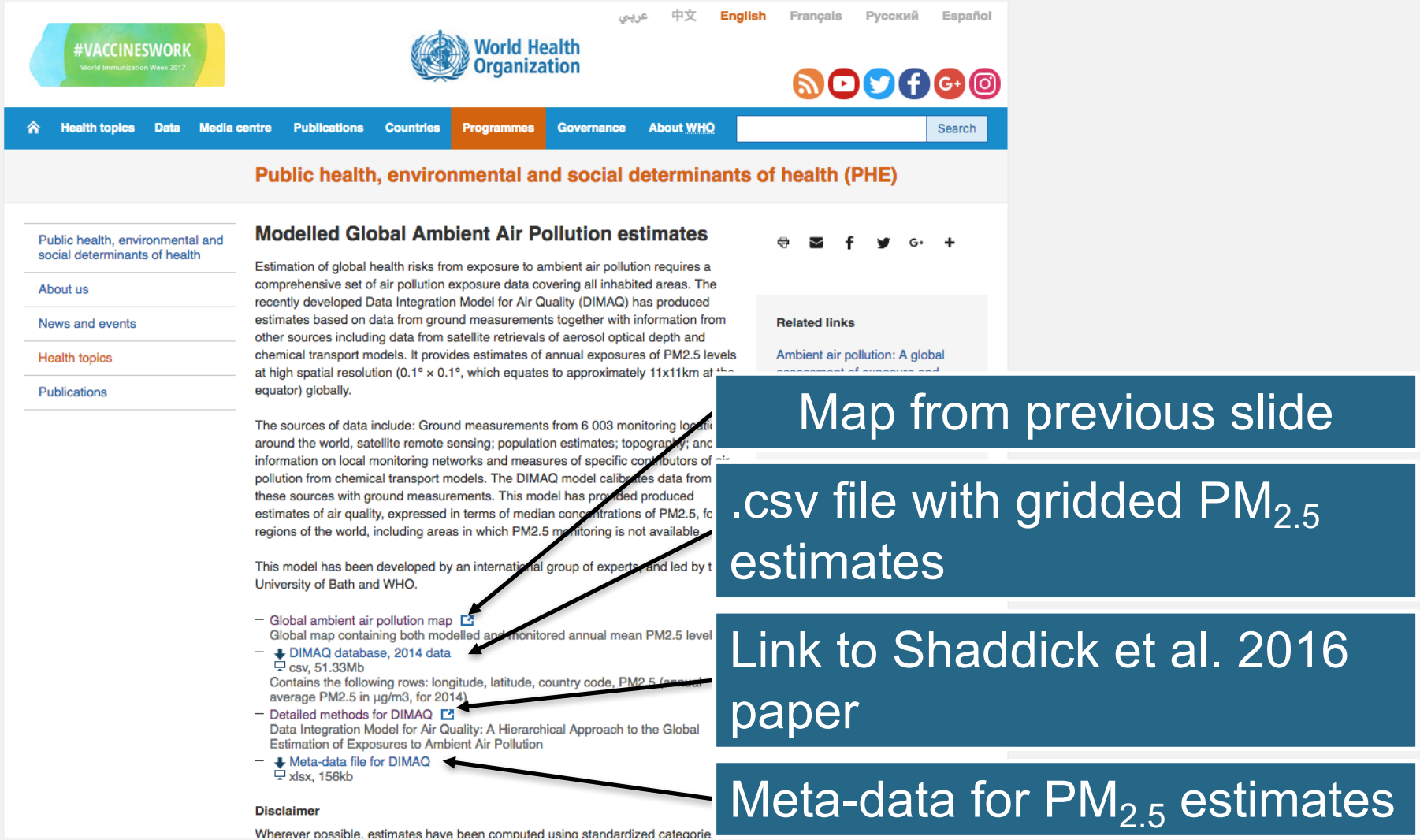
Data Integration Model for Air Quality (DIMAQ)



Shaddick et al. 2016, submitted, Figure 7 (top)

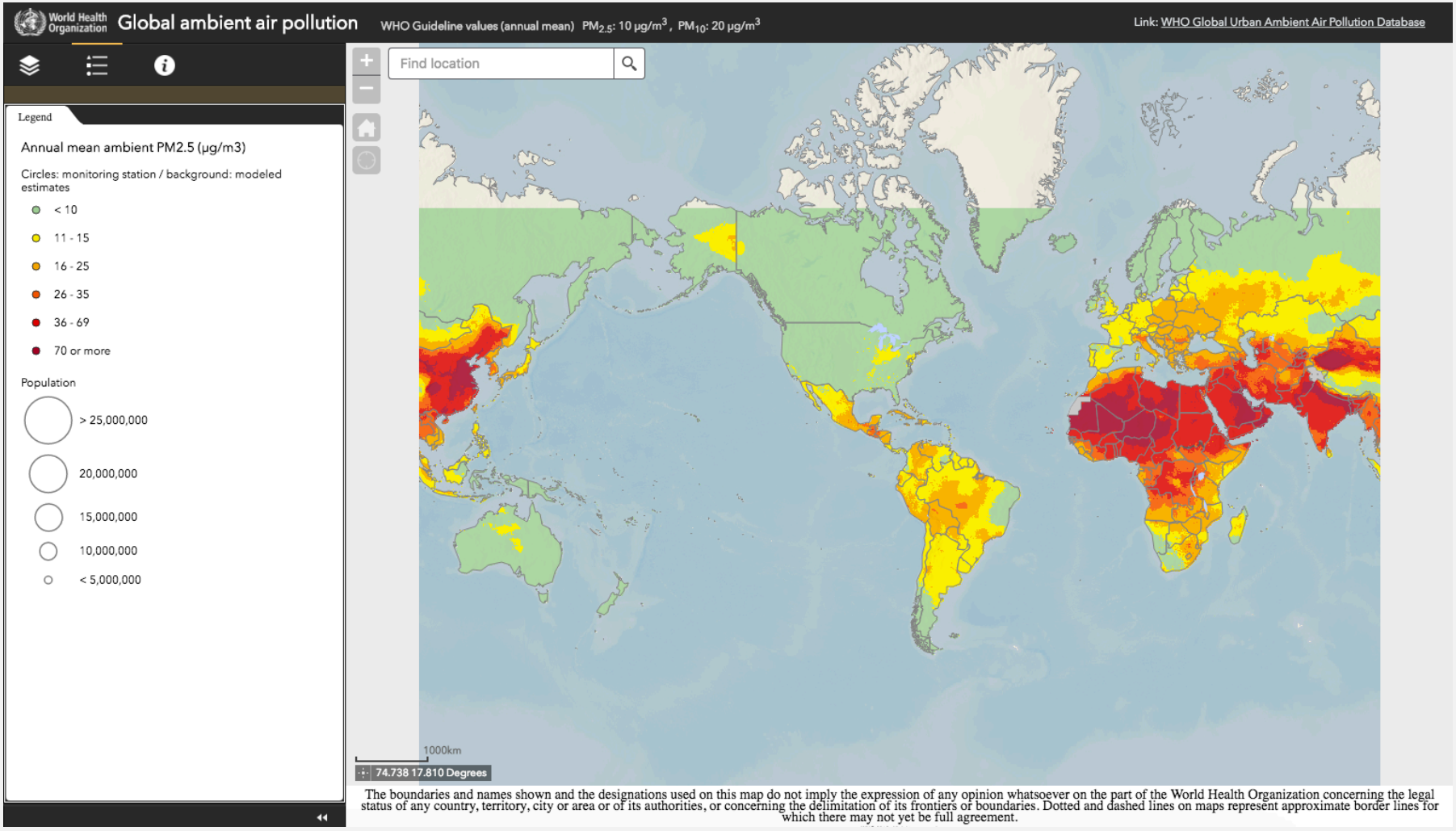
$PM_{2.5}$ at Grid Level

http://www.who.int/phe/health_topics/outdoorair/databases/modelled-estimates/en/



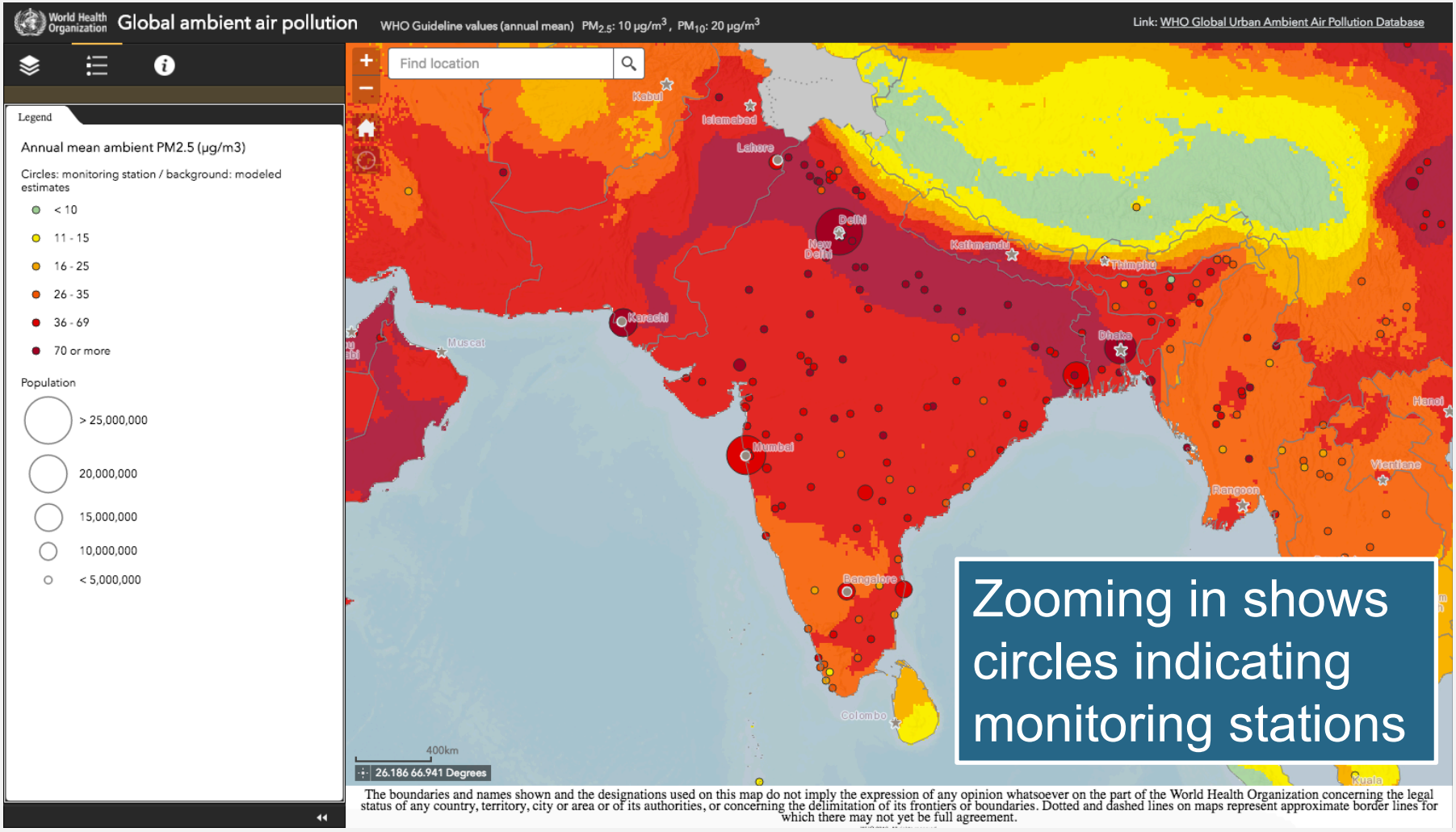
$PM_{2.5}$ at Grid Level

http://maps.who.int/airpollution/



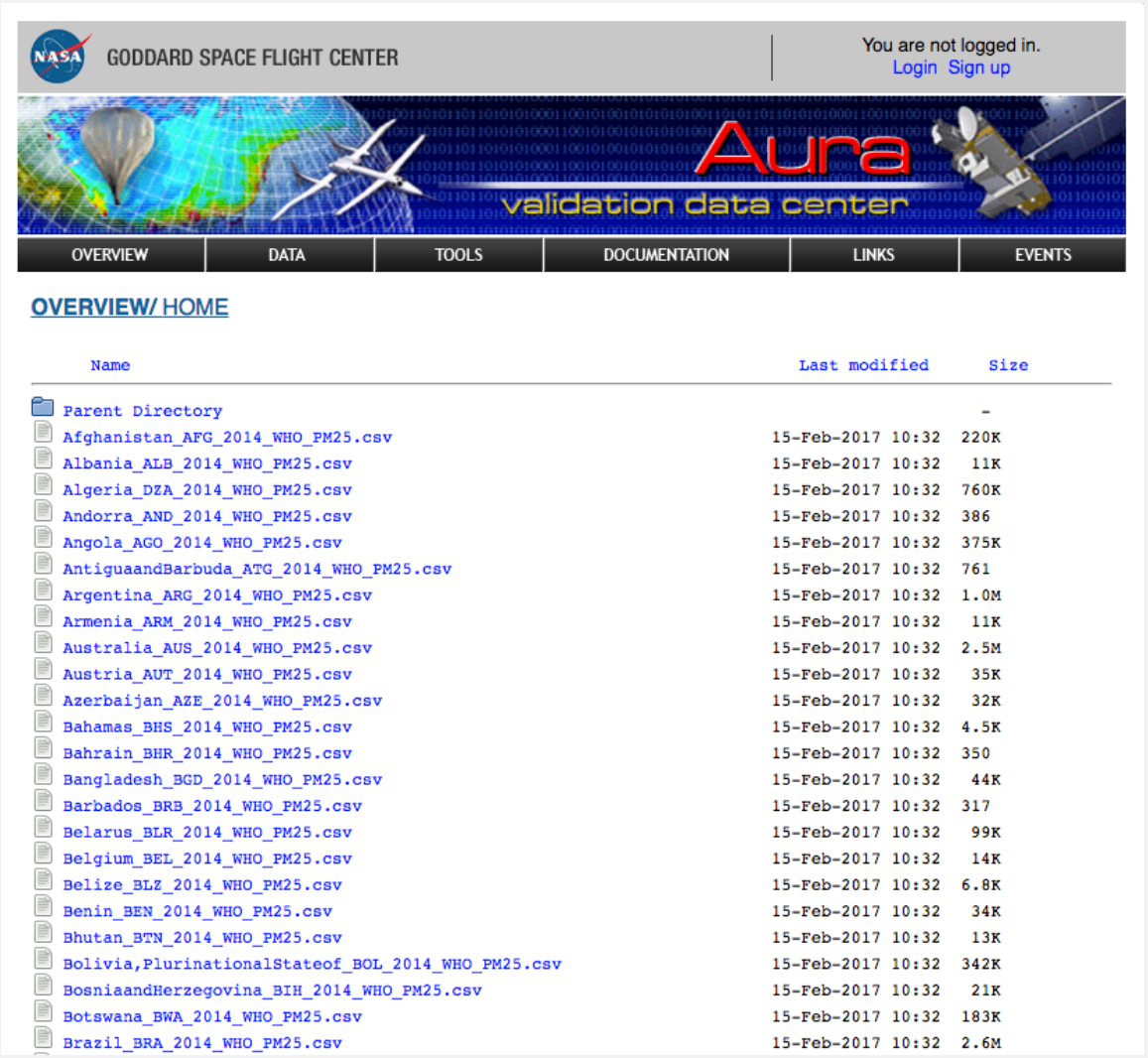
$PM_{2.5}$ at Grid Level

http://maps.who.int/airpollution/



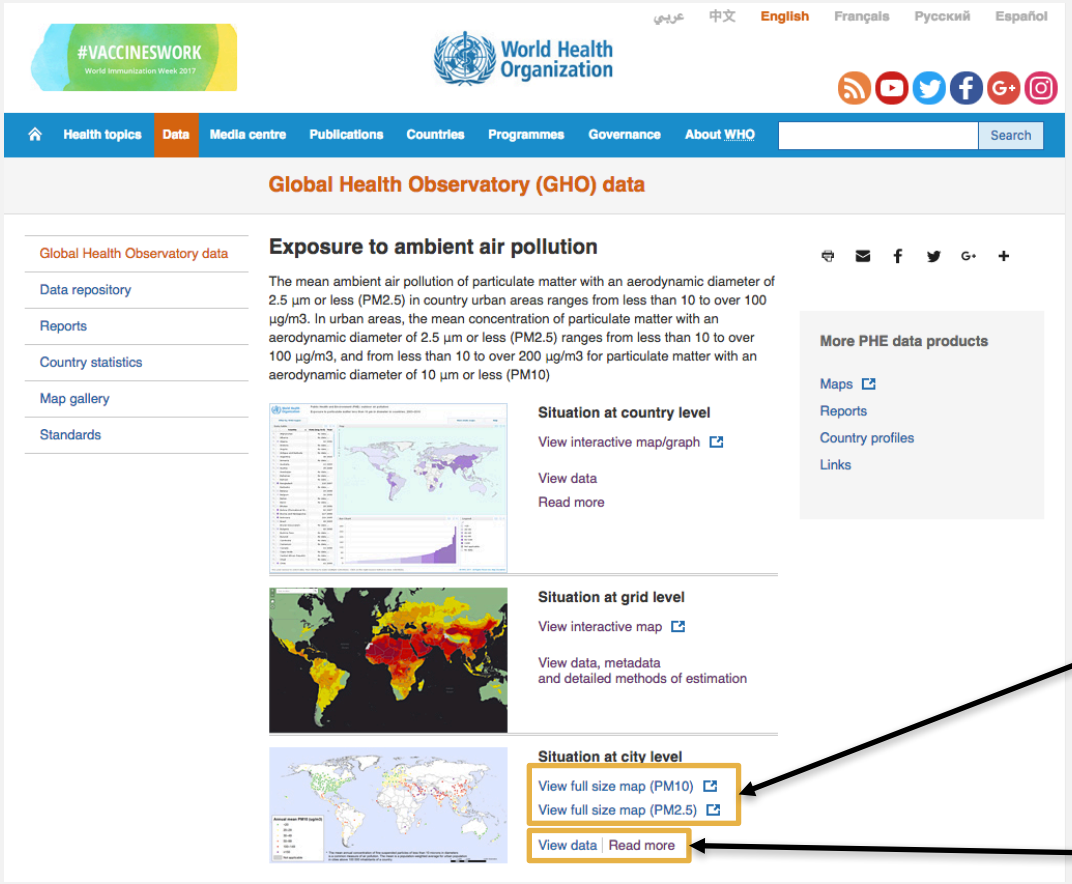
WHO $PM_{2.5}$ Gridded Data: By Country

http://avdc.gsfc.nasa.gov/pub/tmp/WHO_PM25_2014_COUNTRY_DATA/



Where to Find and View the Data

WHO Website: City Level



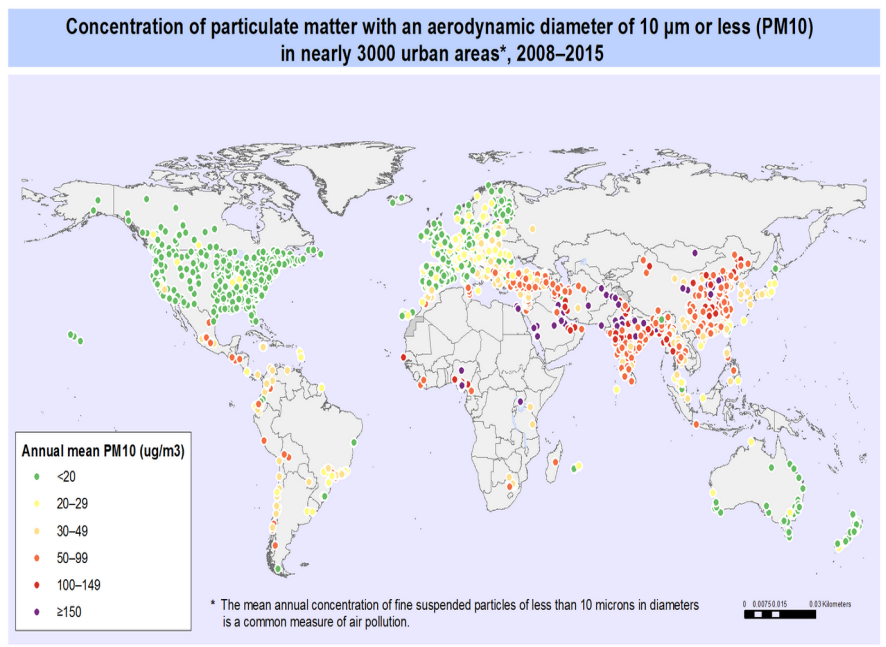
http://www.who.int/gho/phe/outdoor_air_pollution/exposure/en/

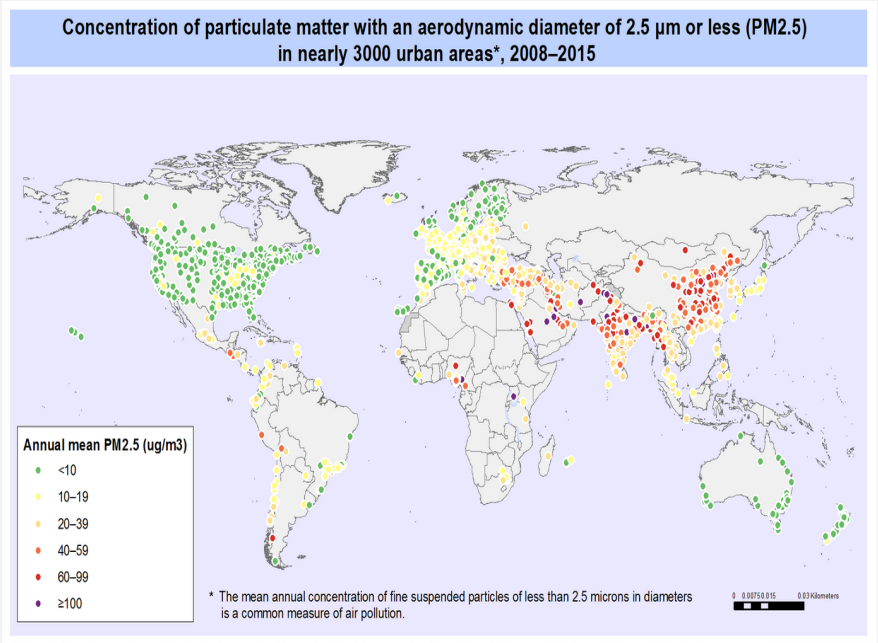
Maps of city level PM_{10} and $PM_{2.5}$

.csv file with city level annual means

$PM_{2.5}$ at City Level

http://www.who.int/gho/phe/outdoor_air_pollution/exposure/en/

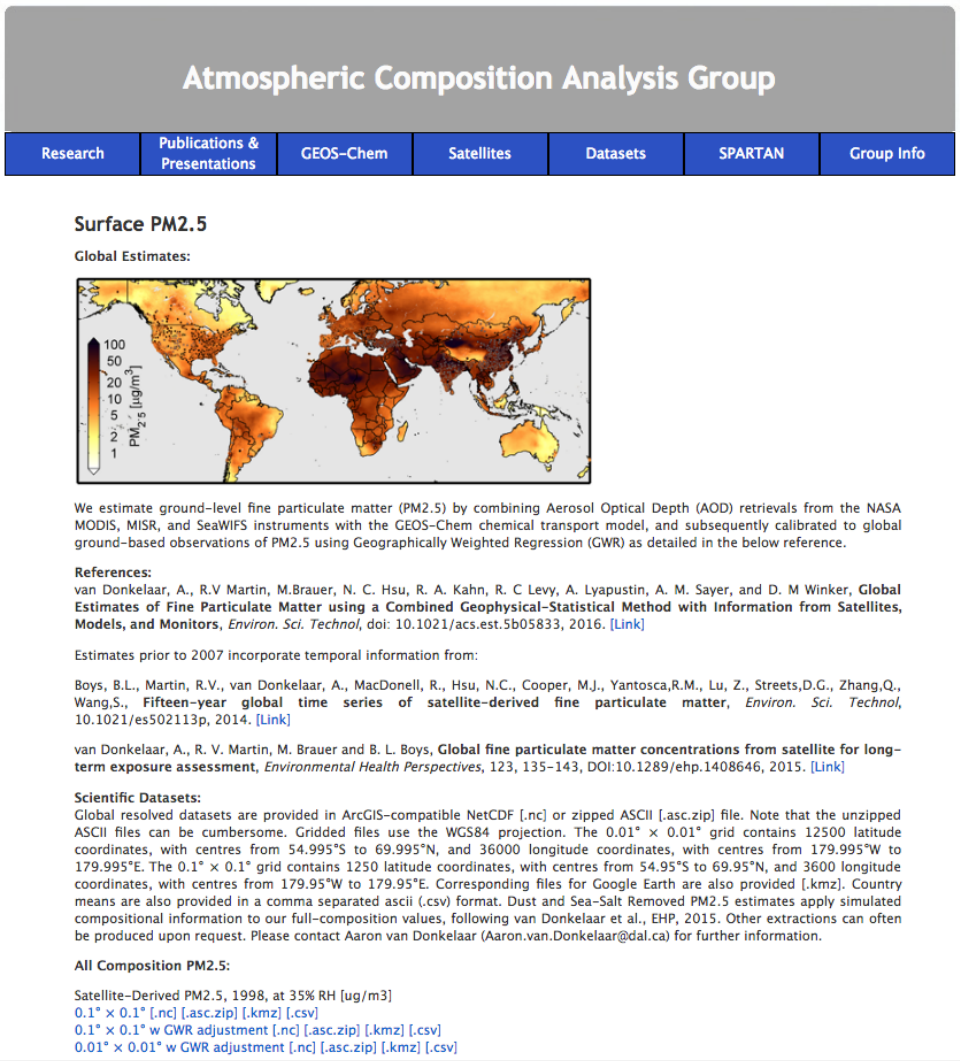





Long Term Time Series

Satellite Derived Surface $PM_{2.5}$ Datasets

http://fizz.phys.dal.ca/~atmos/martin/?page_id=140



Atmospheric Composition Analysis Group

Research | Publications & Presentations | GEOS-Chem | Satellites | Datasets | SPARTAN | Group Info

Surface PM2.5

Global Estimates:

We estimate ground-level fine particulate matter (PM2.5) by combining Aerosol Optical Depth (AOD) retrievals from the NASA MODIS, MISR, and SeaWIFS instruments with the GEOS-Chem chemical transport model, and subsequently calibrated to global ground-based observations of PM2.5 using Geographically Weighted Regression (GWR) as detailed in the below reference.

References:

van Donkelaar, A., R.V Martin, M.Brauer, N. C. Hsu, R. A. Kahn, R. C Levy, A. Lyapustin, A. M. Sayer, and D. M Winker, **Global Estimates of Fine Particulate Matter using a Combined Geophysical-Statistical Method with Information from Satellites, Models, and Monitors**, *Environ. Sci. Technol*, doi: 10.1021/acs.est.5b05833, 2016. [Link]

Estimates prior to 2007 incorporate temporal information from:

Boys, B.L., Martin, R.V., van Donkelaar, A., MacDonell, R., Hsu, N.C., Cooper, M.J., Yantosca,R.M., Lu, Z., Streets,D.G., Zhang,Q., Wang,S., **Fifteen-year global time series of satellite-derived fine particulate matter**, *Environ. Sci. Technol*, 10.1021/es502113p, 2014. [Link]

van Donkelaar, A., R. V. Martin, M. Brauer and B. L. Boys, **Global fine particulate matter concentrations from satellite for long-term exposure assessment**, *Environmental Health Perspectives*, 123, 135-143, DOI:10.1289/ehp.1408646, 2015. [Link]

Scientific Datasets:

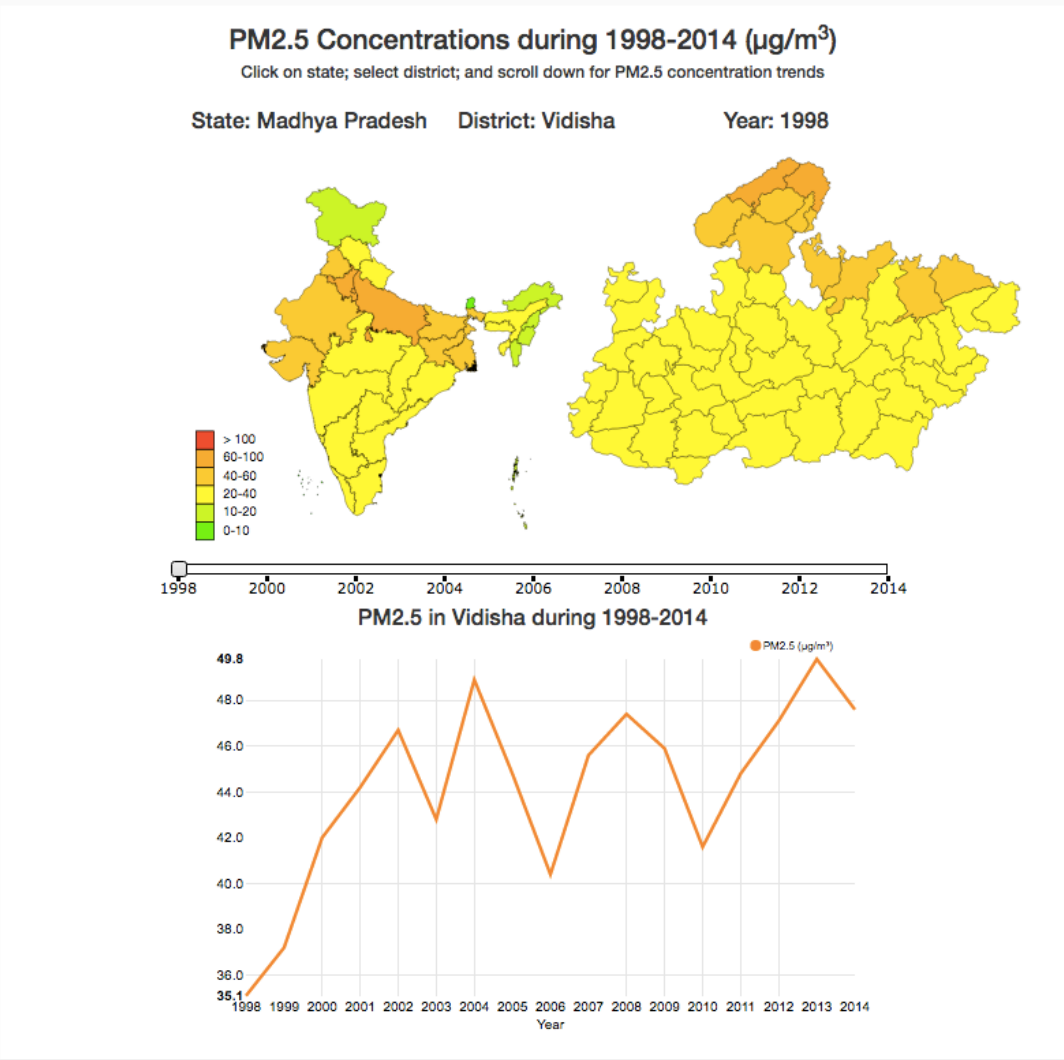
Global resolved datasets are provided in ArcGIS-compatible NetCDF [.nc] or zipped ASCII [.asc.zip] file. Note that the unzipped ASCII files can be cumbersome. Gridded files use the WGS84 projection. The 0.01° × 0.01° grid contains 12500 latitude coordinates, with centres from 54.995°S to 69.995°N, and 36000 longitude coordinates, with centres from 179.995°W to 179.995°E. The 0.1° × 0.1° grid contains 1250 latitude coordinates, with centres from 54.95°S to 69.95°N, and 3600 longitude coordinates, with centres from 179.95°W to 179.95°E. Corresponding files for Google Earth are also provided [.kmz]. Country means are also provided in a comma separated ascii (.csv) format. Dust and Sea-Salt Removed PM2.5 estimates apply simulated compositional information to our full-composition values, following van Donkelaar et al., EHP, 2015. Other extractions can often be produced upon request. Please contact Aaron van Donkelaar (Aaron.van.Donkelaar@dal.ca) for further information.

All Composition PM2.5:

Satellite-Derived PM2.5, 1998, at 35% RH [ug/m3]
0.1° × 0.1° [.nc] [.asc.zip] [.kmz] [.csv]
0.1° × 0.1° w GWR adjustment [.nc] [.asc.zip] [.kmz] [.csv]
0.01° × 0.01° w GWR adjustment [.nc] [.asc.zip] [.kmz] [.csv]

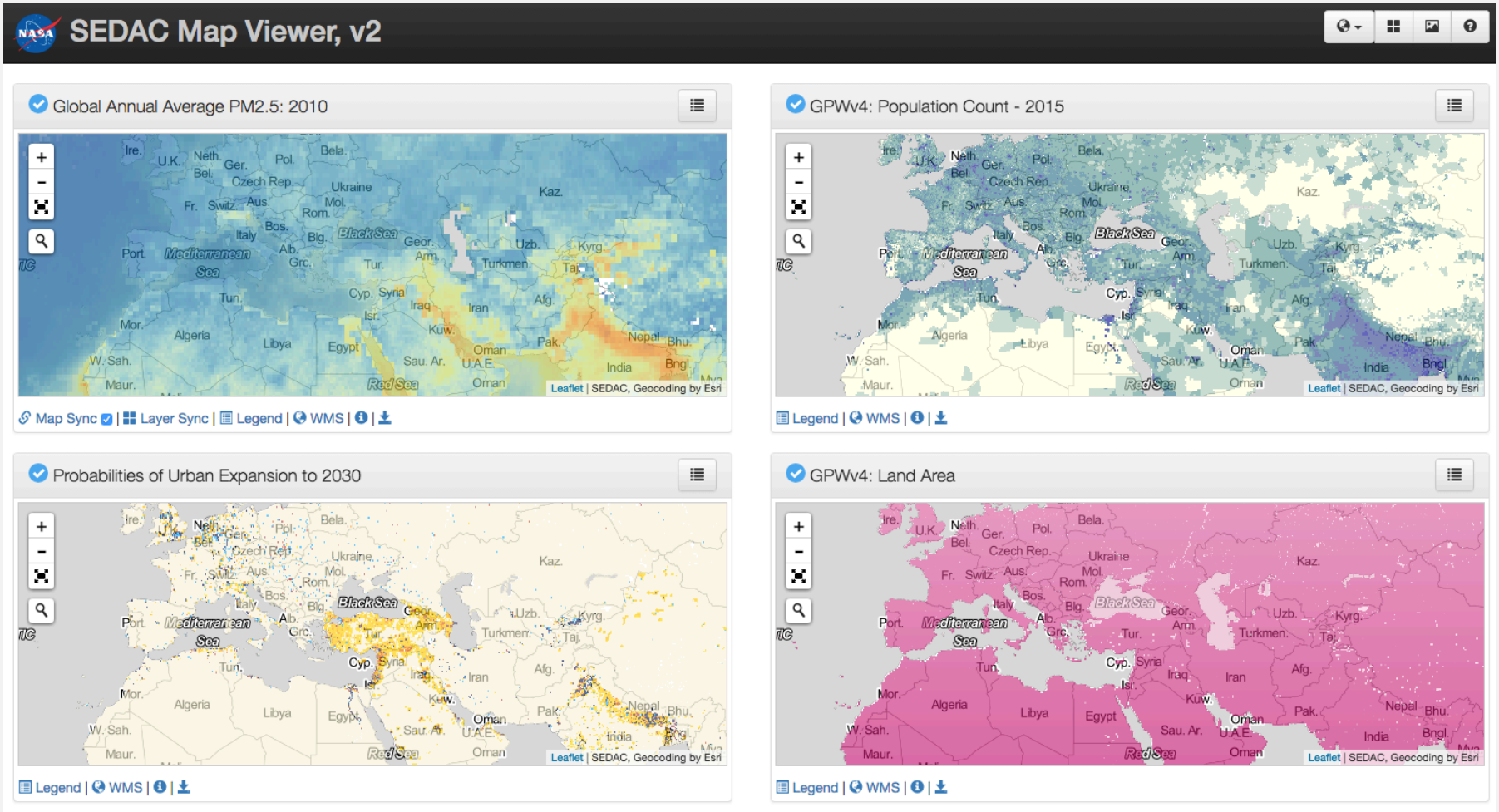
India: Model and Satellite-Derived $PM_{2.5}$

http://www.urbanemissions.info/india-satpm25/



Socioeconomic Data & Applications Center (SEDAC)

http://sedac.ciesin.columbia.edu/mapping/viewer/#



State of Global Air

http://www.stateofglobalair.org/